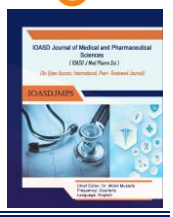
OPEN ACCESS

IOASD Journal of Medical and Pharmaceutical Sciences

IOASD J Med Pharm Sci, Vol-3, Iss-2, Apr-Jun., 2026
Frequency: Quarterly
ISSN: 3049-0294 (Online)
ISSN: 3049-3773 (Print)
Homepage: https://ioasdpublisher.com/ioasdjmps



Effectiveness of warm water foot bath on fatigue among chronic renal failure patients undergoing hemodialysis in hospitals of Sikkim

Sneha Pradhan[1], Wangkheimayum Ashalata Devi[2*], Karma Doma Bhutia[3]

[1]M.Sc. Nursing, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, India.
[2]Professor, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, India.
[3]Assistant Professor, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, India.

Corresponding Author: Wangkheimayum Ashalata Devi
Professor, Sikkim Manipal College of Nursing, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, India.

DOI: 10.67224/ioasdjmps.2026.v03i02.001

ABSTRACT

Background: The prevalence of fatigue among hemodialysis patients varies from 60 to 97%, which affects the patient's quality of life. Thus, this study aimed to assess the effectiveness of warm water foot bath on fatigue among chronic renal failure patients undergoing hemodialysis. ***Materials and methods:*** The current research utilized a quasi-experimental time-series design and included 60 individuals with chronic renal failure receiving hemodialysis treatment. The participants were recruited using purposive sampling and were divided equally into an experimental group and a control group. Prior to the intervention, the Piper Fatigue Scale-12 was utilized to measure fatigue. The experimental group received three successive footbaths with warm water at temperatures ranging from 100 to 110°F for 15 minutes each time. The same fatigue scale was used to conduct post-intervention evaluation 30 minutes after each session. ***Results:*** One-way ANOVA was used to assess significant difference between the means of two groups which revealed that the significance values were 0.112, 0.812 and 0.643 during first, second and third session respectively whereas during the post-test, that there is a significant difference in fatigue level during the first {F =8.866, p=0.004}, second {F= 15.268, p=0.000} and third session {F= 21.147, p=0.000} concluding that post-test fatigue levels varied significantly across the different sessions. ***Conclusion:*** The warm water foot bath is an easy and inexpensive way to address fatigue among patients with chronic renal failure receiving hemodialysis.

Key words: chronic renal failure, hemodialysis, fatigue, warm water footbath.

Original Research Article

Article History
Received: 25-04-2026
Accepted: 22-05-2026
Published: 26-05-2026

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Chronic Kidney Disease (CKD), commonly referred to as chronic renal failure, is a condition in which kidney function gradually declines and necessitates renal replacement therapy [1]. It is an irreversible deterioration in renal function classically developing over years and is defined as kidney damage or glomerular filtration rate <60 ml/min/1.73m^2 for three months or more irrespective of the cause.

The majority of individuals with severe chronic kidney disease develop end stage renal disease (ESRD), which is associated with high morbidity and mortality [2]. Hemodialysis, a time-consuming process that lowers patients' quality of life, is currently the major treatment for those with chronic renal failure.

Although hemodialysis treatment is essential, the treatment is perceived as burdensome. Patients commonly experience multiple health complaints such as fatigue, intradialytic hypotension, cramps and dizziness [3]. Fatigue impairs one's ability to perform daily activities and care for oneself. It may also lead to increasing dependency on others and unemployment, both of which impair quality of life. The prevalence of fatigue among hemodialysis patients ranges from 60 to 97%, making it one of the most often reported symptoms.

Warm water foot bath involves soaking the feet and ankles in water between 100 to 110 degrees Fahrenheit (38 to 43 degrees Celsius) for 10 to 30 minutes. It warms the body, improves blood circulation, and has a soothing effect. Warm water foot bath warms the skin, causing the vessels to dilate and the heat to dissipate. The body responds to warm water foot bath therapy at temperatures between 40°C and 42°C by dilating and displaying symptoms of tension loss in the capillary vessels [4].

Need for study

According to the United States Renal Data System 2020 Annual Report, around 786,000 people in the United States have End stage renal disease and 71% are receiving dialysis [5]. Study conducted by Dr. Jain Kumar Amit et al., in Sikkim to delineate clinic-epidemiological and laboratory profile of patients on hemodialysis revealed that out of 50 chronic renal failure patients undergoing hemodialysis, 47% experienced fatigue as a result of hemodialysis [6].

Another study conducted by B. Fandri et al to assess the post dialysis fatigue among 58 hemodialysis patients revealed that level of fatigue in hemodialysis patients was moderate in 67.3% and severe in 10.3% of cases [7]. After each session, the majority of dialysis patients need to rest for more than 3 hours to recuperate from fatigue caused by dialysis. As a result, fatigue management is a significant clinical priority for medical professionals.

Another study was conducted by Irene Thakuria et al to assess the effect of warm water footbath on chemotherapy induced fatigue among cancer patients revealed that there was a highly significant difference between the mean pre-interventional and post-interventional scores in the experimental group at various time points [8].

The investigator observed that majority of the hemodialysis patients had varying degrees of fatigue throughout clinical placements in the hemodialysis unit and hence was interested to provide the hemodialysis patients with a low-cost, non-pharmacological intervention, warm water foot bath, to help reduce the level of fatigue. Therefore, this study is initiated to assess the effectiveness of warm water foot bath on fatigue among patients with chronic renal failure undergoing hemodialysis in hospitals of Sikkim, so that it may relieve the level of fatigue and improve the quality of life among patients undergoing hemodialysis.

Problem Statement

"Effectiveness of warm water foot bath on fatigue among chronic renal failure patients undergoing hemodialysis in hospitals of Sikkim"

Objectives:

1. to assess the pre and post-test level of fatigue among patients undergoing hemodialysis in experimental and control group
2. to evaluate the effectiveness of warm water foot bath on level of fatigue among patients undergoing hemodialysis in experimental group
3. to determine the association between the level of fatigue among patients undergoing hemodialysis with their selected demographic variables

Hypothesis

- **H_1:** There is a significant difference between the pre and post test score on level of fatigue among patients undergoing hemodialysis in experimental group
- **H_2:** There is a significant association between the level of fatigue among patients undergoing hemodialysis with their selected demographic variables.

MATERIALS AND METHODS

The current research utilized a quasi-experimental time-series design to assess the effectiveness of warm water footbath among patients undergoing hemodialysis. The research was conducted in selected hospitals of Sikkim and included 60 individuals with chronic renal failure who were receiving hemodialysis treatment. The participants were recruited using purposive sampling and were divided equally into an experimental group and a control group.

Instrument

Demographic Proforma

It comprised of 11 questions related to demographic variables of chronic renal failure patients undergoing hemodialysis including age, gender, marital status, residential area, religion, educational qualification, occupation, duration of hemodialysis treatment, frequency of dialysis, time duration of each dialysis and any associated illnesses.

Piper Fatigue Scale-12

It consists of 12 questions to assess the level of fatigue among patients undergoing hemodialysis.

Data collection procedure

Consent was taken from individual samples and the demographic profile was collected. Both groups were subjected to a pre-test using the Piper Fatigue Scale-12 to determine their level of fatigue. Warm water foot bath therapy (at temperature ranging from 100 to 110 ºF for 15 minutes) was administered to samples in experimental group for three consecutive sessions, while routine care was provided to the control group. Post-test was conducted for both the groups after 30 minutes by using the same scale (Piper Fatigue Scale-12). The pre and post interventional assessment for fatigue was conducted every session for both the groups.

Data analysis

The data was analyzed by using SPSS software version 29. The demographic variables were analyzed with descriptive statistics (frequency and percentage). The significant difference in the level of fatigue between and within experimental and control group was analyzed using inferential statistics (one-way ANOVA) and the association between fatigue and demographic variables were assessed by using Fisher's exact test.

Ethical consideration

Formal permission was taken from the Institutional Ethics Committee and the concerned hospitals before the data collection. The participants were explained about the study and the related purposes and their informed consents were obtained.

RESULTS:

Section I: Findings related to demographic profile of chronic renal failure patients undergoing hemodialysis

Majority, 13 (43%) of patients in the experimental group belonged to the age group of 41-60 years and 11(37%) of patients in the control group belonged to the age group of 20-40 and ≥61 years each. Among all, maximum of the samples was unemployed in both the experimental i.e.,18 (60%) and control group i.e.,19 (63%). Most of the patients were undergoing hemodialysis for 0-3 years in the experimental 19 (63%) and control group 12 (40%). Majority of the patients,17 (57%) of patients, were undergoing hemodialysis for 3 sessions per week in the experimental group whereas 17 (57%) of patients underwent 2 sessions per week in the control group. Most of the patients had associated illness in experimental i.e., 23 (77%) and control group i.e., 21 (70%).

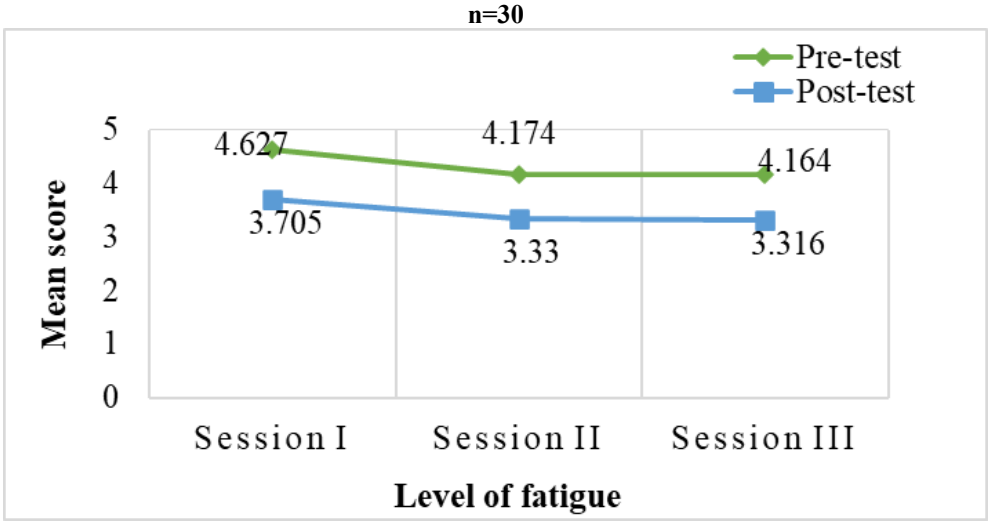


Figure1: Line graph showing the mean scores of pre-test and post-test level of fatigue during the different sessions among the experimental group

Section II: Findings related to the assessment of level of fatigue among the experimental and control group

The data presented in Figure 1 shows that among the experimental group, there was a decrease in the level of fatigue after the intervention among the chronic renal failure patients undergoing hemodialysis whereas in the control group (Figure 2), level of fatigue increased with the succeeding sessions.

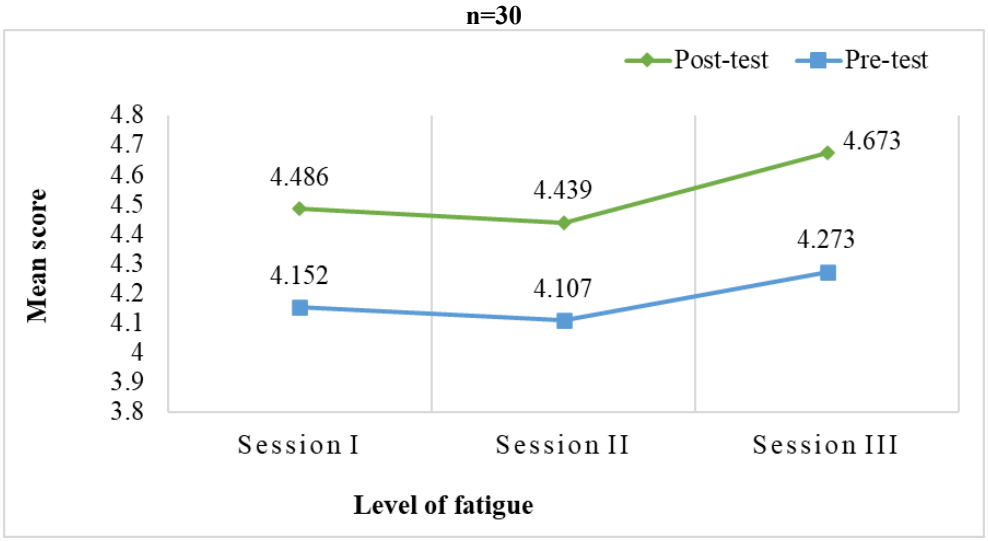


Figure 2: Line graph showing the mean scores of pre-test and post-test level of fatigue during the different sessions among the control group

Section III: Findings related to effectiveness of warm water foot bath on level of fatigue among patients undergoing hemodialysis

One-way ANOVA was used to determine whether there is a significant difference between the means of two groups. The significance values were 0.112 in the first session, 0.812 in the second session and 0.643 in the third session which is considerably higher than the significance threshold of p <0.05 indicating that there was no statistically significant difference between the group during the pre-test

Table 1: One-way ANOVA to compare the difference in post-test level of fatigue among chronic renal failure patients undergoing hemodialysis in Experimental and Control group

N=60

	Test	Sum of Squares	Df	Mean Square	F value	Remarks
Session I	Between Groups	9.142	1	9.142	8.866	0.004*
	Within Groups	59.805	58	1.031		
	Total	68.946	59			
Session II	Between Groups	18.426	1	18.426	15.268	0.000*
	Within Groups	69.996	58	1.207		
	Total	88.422	59			
Session III	Between Groups	26.031	1	26.031	21.147	0.000*
	Within Groups	71.393	58	1.231		
	Total	97.424	59			

p<0.05 level of significance, *- significant, NS-not significant

The data in Table 1 shows that during the post-test, that there was a significant difference in fatigue level between the experimental and control group during the first {F (1,58) = 8.866, p=0.004}, second {F (1,58) = 15.268, p=0.000} and third session {F (1,58) = 21.147, p=0.000. Hence, the research hypothesis H_1 was accepted

Section IV: Findings related to association between the level of fatigue among patients undergoing hemodialysis with their selected demographic variables

Table 2: Association between pre-test level of fatigue (1st Session) with their demographic characteristics in experimental and control group

N=60 (30+30)

Demographic characteristics	Experimental Group			Fisher's Exact Test/ P-value	Control Group			Fisher's Exact Test/ P-value
	Mild fatigue	Moderate Fatigue	Severe fatigue		Mild fatigue	Moderate fatigue	Severe fatigue	
Age (in years)								
a) 20-40	4	6	0	4.636/	2	9	0	0.454/
b) 41-60	1	11	1	0.249 NS	2	6	0	1.000 NS
c) ≥61	1	6	0		3	8	0	
Gender								
a) Female	3	9	0	0.985/	2	8	0	0.093/
b) Male	3	14	1	0.802 NS	5	15	0	1.000 NS
Marital status:								
a) Married	3	18	1		6	19	0	
b) Single	3	5	0	2.388	1	4	0	0.037/
c) Divorced	0	0	0	0.490	0	0	0	1.000 NS
d) Widow	0	0	0		0	0	0	
Residential area:								
a) Rural area	4	16	0	2.007/	6	17	0	0.418/
b) Urban area	2	7	1	0.429 NS	1	6	0	0.653 NS
Occupation:								
a) Government employee	1	2	0		2	3	0	
b) Private employee	1	2	0	11.733/	1	1	0	3.124/
c) Self employed	0	0	1	0.165 NS	0	1	0	0.579 NS
d) Unemployed	3	15	0		4	15	0	
	1	4	0		0	3	0	

Demographic characteristics	Experimental Group			Fisher's Exact Test/ P-value	Control Group			Fisher's Exact Test/ P-value
	Mild fatigue	Moderate Fatigue	Severe fatigue		Mild fatigue	Moderate fatigue	Severe fatigue	
e) Retired								
Duration of hemodialysis treatment: a) 0-3 years b) 4-6 years c) 7-10 years	 4 2 0	 14 7 2	 1 0 0	2.170/ 1.000 NS	 3 0 4	 9 9 5	 0 0 0	4.881/ 0.074 NS
Frequency of hemodialysis: a) 2 sessions/week b) 3 sessions/week	 2 4	 10 13	 1 0	1.492/ 0.640 NS	 3 4	 14 9	 0 0	0.709/ 0.666 NS
Any associated illnesses: a) Yes b) No	 4 2	 18 5	 1 0	1.029/ 0.702 NS	 5 2	 16 7	 0 0	0.009/ 1.000 NS

p<0.05 level of significance, *- significant, NS-not significant

Table 2 reveals that there was no significant association among the experimental and control group with the selected demographic variables at p <0.05 level of significance.

DISCUSSION

The aim of this study was to assess the effectiveness of warm water footbath among chronic renal failure patients undergoing hemodialysis. The study findings showed that in the experimental group, the mean score of fatigue during the pre-test was 4.627±1.263, 4.174±1.010 and 4.164± 0.683 respectively during the first, second and third session whereas during the post-test, the mean scores were 3.705±1.109, 3.330±0.976 and 3.316±0.971. The findings indicated that there was a decrease in the level of fatigue in the experimental group both in pre-test as well as in the post-test in every session.

The similar finding was obtained by Gitanjali Das et al where mean score of level of fatigue was 7.20 and 2.76 during the pre-test and post-test respectively and the calculated t value (28.38) was higher than the table value (2.05) indicating that warm water footbath is highly effective in reducing the level of fatigue [9].

The present study revealed that there was a significant difference between the means of two groups. The significance values were 0.112, 0.812and 0.643 during first, second and third session respectively whereas during the post-test, that there was a significant difference in fatigue level between the experimental and control group during the first {F =8.866, p=0.004}, second {F= 15.268, p=0.000} and third session {F= 21.147, p=0.000 concluding that there was a significant difference in the post-test level of fatigue in different sessions among experimental group.

In addition, the findings were consistent with the study conducted by Sams S. Soumya et al which revealed that during the pre-test assessment, the mean fatigue score of experimental group was 6.41±0.48 whereas the mean post-test fatigue score was 5.85±0.57, 5.03±0.71, 3.66 ±0.37 on 3rd, 5th and 7th day concluding that footbath therapy is effective in reducing the fatigue as computed using ANOVA (F (3,56) = 2.76; p<0.05) and unpaired 't' test (t (28) = 2.048, p<0.05) [10].

CONCLUSION

The main inference deduced from this study was that a warm water foot bath has the potential to alleviate fatigue among patients with chronic renal failure who are on hemodialysis, which may lessen the requirement for pharmaceutical intervention. Warm water foot bath can be easily used by the nurses or other health care professionals and can be included as a routine care for patients on hemodialysis. Hence, it was concluded that warm water foot bath is a useful and easy method for managing fatigue among chronic renal failure patients on hemodialysis.

ACKNOWLEDGMENT

The authors would like to thank all the participants included in the study and nursing staffs at Central Referral Hospital and New STNM Hospital, Sikkim for their support and cooperation during the study. Special thanks to Principal, Sikkim Manipal College of Nursing for her continuous encouragement and support.

CONFLICTS OF INTEREST STATEMENT:

Nil

REFERENCES

1. Vaidya SR, Aeddula NR (2023). Chronic Renal Failure. StatPearls Publishing; 2023 Jan. Retrieved from https://www.statpearls.com/point-of-care/28357
2. Levey, A. S., Coresh, J., Bolton, K., Culleton, B., Harvey, K. S., Ikizler, T. A., ... & Briggs, J. (2002). K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *American Journal of Kidney Diseases*, *39*(2 SUPPL. 1), i-ii+.:266. doi: 10.1016/S0272-6386(02)70081-4
3. Caplin, B., Kumar, S., & Davenport, A. (2011). Patients' perspective of haemodialysis-associated symptoms. *Nephrology Dialysis Transplantation*, *26*(8), 2656-2663. doi:10.1093/ndt/gfq763
4. Sam Susan Soumya, Shambhavi (2014). Effectiveness of Foot bath Therapy on Fatigue Among Patients with Chronic Renal Failure in selected hospitals at Mangalore. *International Journal of Scientific Research. 3*(7): 398-400. doi: 10.15373/22778179/July2014/123
5. National Institutes of Health. (2022). United States Renal Data System: 2022 USRDS Annual Data Report: Epidemiology of Kidney Disease in the United States. *National Institute of Diabetes and Digestive and Kidney Diseases: Bethesda, MD, USA*.. Retrieved from http://adr.usrds.org/2020/
6. Jain Amit, Khatri Dheeraj, Theengh Diki, Nandi Parvati (2018). Clinico-epidemiological profile of haemodialysis patients in a teaching hospital in North Eastern India. 7(4): 15-18. doi: 10.36106/ijsr
7. Fandri B. (2022). Post-dialysis fatigue in hemodialysis patients: Piper Fatigue Scale. *Kidney International Reports. 7*(2): 316. doi: 10.1016/j.ekir.2022.01.769
8. ThakuriaIrene, D'SouzaSonia, D'Almeida Victoria. (2022). Effect of warm water footbath on chemotherapy-induced fatigue among patients with cancer in a selected hospital at Mangaluru. *Indian Journal of Continuing Nursing Education. 23*(2): 153-158. doi: 10.4103/ijcn.ijcn_12_21
9. Das Gitanjali, R Asokan, Lenka Amarita. (2018). Effectiveness of warm foot bath on fatigue among patient with chronic renal failure patient. *International Journal of Nursing Education. 10*(4): 15-17. doi: 10.5958/0974-9357.2018.00092.2
10. Sam Susan Soumya, Shambhavi. (2014). Effectiveness of Foot bath Therapy on Fatigue Among Patients with Chronic Renal Failure in selected hospitals at Mangalore. *International Journal of Scientific Research. 3*(7): 398-400. doi: 10.15373/22778179/July2014/123.